CLAIMS

1. Apparatus for carrying out a melting and casting operation in the fine casting art, in particular the dental art, comprising

- a melting crucible (2) for receiving melting charge,
- a heating device (3) for heating the melting charge in the melting crucible (2), and
- a pyrometer (8) for ascertaining the temperature of the melting charge,

characterised by

- a control device (4) for controlling the melting and casting operation in dependence on the ascertained melting charge temperature,
- wherein the control device (4) has a database (16) with a plurality of selectable, respectively melting charge material-specific parameter sets (PS1, PS2, PS3) each with one or more parameters for configuring the pyrometer (8).

2. Apparatus as set forth in claim 1 characterised in that each parameter set (PS1, PS2, PS3) has one or more parameters for controlling the melting and casting operation in dependence on the melting charge material.

3. Apparatus as set forth in claim 1 or claim 2 characterised in that the control device (4) has an input unit (14) for the input of melting charge identification for the selection of a parameter set (PS1, PS2, PS3).

4. Apparatus as set forth in one of the preceding claims characterised in that the pyrometer (8) is a quotient pyrometer.

5. Apparatus as set forth in one of the preceding claims characterised in that one or more sensors (9) of the pyrometer (8) can be directed by means of an optical system (11) directly on to at least one partial region of the melting crucible (2).

6. Apparatus as set forth in one of claims 1 through 4 characterised in that the sensor or sensors (9) of the pyrometer (8) is/are connected to the connected optical system (11) by way of an optical waveguide (10) which can be directed on to at least one partial region of the melting crucible (2).

7. Apparatus as set forth in one of the preceding claims characterised in that the control device (4) has a communication interface for supplementing and/or updating the data base (16), parameter sets (PS1, PS2, PS3), parameters and/or control programs and/or for reading out protocols of a melting and casting operation and/or parameters.

8. Apparatus as set forth in one of the preceding claims characterised in that associated with each melting charge identification is its own parameter set (PS1, PS2, PS3).

9. Apparatus as set forth in one of claims 1 through 7 characterised in that associated with a respective group of a plurality of melting charge identifications of a melting charge family, in particular an alloy family, having substantially identical or similar melting and casting properties, is an individual parameter set.

10. Apparatus as set forth in one of the preceding claims characterised in that the heating device (3) is adapted by the control device (4) in such a way that a predetermined temperature of the molten material is kept substantially constant.

11. Apparatus as set forth in one of the preceding claims characterised in that the heating device (3) is controllable by the control device (4) in such a way that the heating power of the heating device (3) is reduced when a predetermined temperature of the molten material is reached.

12. Apparatus as set forth in one of the preceding claims characterised in that the control device (4) is so designed that it selects a parameter in dependence on the melting charge temperature pattern ascertained during a melting operation, in particular the ascertained solidus temperature and/or the ascertained liquidus temperature.

13. Apparatus as set forth in one of the preceding claims characterised in that the control device (4) is operable in a pyrometer calibration mode in which the control means sets calibration parameters for calibrating the pyrometer in dependence on the temperature pattern ascertained with a predetermined reference melting charge, in particular the solidus-liquidus temperature characteristic.

14. Apparatus as set forth in one of the preceding claims characterised in that the control device (4) is operable in a testing mode in which the control means checks the pyrometer (8) on the basis of the temperature pattern ascertained with a predetermined reference melting charge, in particular the solidus-liquidus temperature characteristic.

15. Apparatus as set forth in claim 13 or claim 14 characterised in that the reference melting charge is a pure metal, in particular pure copper.

16. Apparatus as set forth in one of the preceding claims characterised in that the control device (4) controls the melting and casting operation in dependence on the presence or the absence of an auxiliary means (17) which can be arranged in the region of the melting crucible, in particular a graphite insert, for assisting with the heating operation.

17. Apparatus as set forth in claim 16 characterised in that the ascertained melting charge temperature is reduced by a temperature difference value $T_{\ddot{U}}$ when the auxiliary means (17) is present.

18. Apparatus as set forth in claim 17 characterised in that the temperature difference value $T_{\ddot{U}}$ is ascertained from the casting temperature T_G approximately in accordance with the following equation:

$$T_{\ddot{U}} = ((T_o - T_G)/(T_o - T_u))* T_{const.}$$

wherein T_o is an upper temperature value in the range of between 1300°C and 1600°C, in particular 1400°C, T_u is a lower temperature value in the range of between 800°C and 1100°C, in particular 1000°C, and $T_{const.}$ is a temperature constant in the range of between 50°C and 250°C, in particular between 80°C and 180°C, in particular 100°C.

19. Apparatus as set forth in one of claims 16 through 18 characterised in that a given moment in time during the melting and casting operation is displaced by a compensating time duration t_V when the auxiliary means (17) is present.

20. Apparatus as set forth in claim 19 characterised in that the compensating time duration t_V is ascertained from the casting temperature T_G approximately in accordance with the following equation:

$$t_V = ((T_o - T_G)/(T_o - T_u))* t_{const.}$$

wherein T_o is an upper temperature value in the range of between 1300°C and 1600°C, in particular 1400°C, T_u is a lower temperature value in the range of between 800°C and 1100°C, in particular 1000°C, and $t_{const.}$ is a time constant in the range of between 10 seconds and 120 seconds, in particular 60 seconds.

21. A method of carrying out a melting and casting operation in the fine casting art, in particular the dental art, in particular with a casting apparatus (1) as set forth in one of claims 1 through 20, comprising the following steps:

- introducing melting charge into a melting crucible (2),
- heating the melting charge by means of a heating device (3), and
- ascertaining the temperature of the melting charge by means of a pyrometer (8),

characterised by

- controlling the melting and casting operation in dependence on the ascertained melting charge temperature,

- wherein one of a plurality of melting charge material-specific parameter sets (PS1, PS2, PS3) is selected from a database (16) in dependence on the introduced melting charge and the pyrometer (8) is configured by means of one or more parameters of the selected parameter set (PS1, PS2, PS3).

22. A method as set forth in claim 21 characterised in that the melting and casting operation is controlled by means of one or more material-specific parameters of the selected parameter set (PS1, PS2, PS3).

23. A method as set forth in claim 21 or claim 22 characterised in that a parameter set is selected on the basis of a melting charge identification inputted by means of an input unit.

24. A method as set forth in one of claims 21 through 23 characterised in that the temperature of the molten material is kept substantially constant at a predetermined temperature for a predetermined period of time.

25. A method as set forth in one of claims 21 through 24 characterised in that the heating power of the heating device (3) is reduced when a predetermined temperature of the molten material is reached.

26. A method as set forth in one of claims 21 through 25 characterised in that a parameter set is selected on the basis of a melting charge temperature pattern ascertained during a melting operation, in particular the ascertained solidus temperature and/or the ascertained liquidus temperature.

27. A method as set forth in one of claims 21 through 25 characterised in that a melting operation is implemented with a reference melting charge and a temperature pattern, in particular the solidus-liquidus temperature characteristic, is ascertained and compared to a reference characteristic, stored in the database (16), of the reference melting charge and the pyrometer (8) is calibrated and/or checked by means of the comparison result.